Nov 2005

Operational Workaround to Address the Bypass Map Range Placement Error

Background: During the ORDA Beta Test, it was discovered that the starting range adaptable parameter in the Bypass Map Generation software was incorrectly set. This starting range parameter results in targets being placed on the Bypass Map 1km closer to the radar than they actually are. The operational impact of this range placement error is only apparent at locations that have large/hard targets outside of the immediate local area of the RDA, such as mountain ranges.

Impact: Figure 1 illustrates the Bypass Map placement problem. The Bypass Map (left) is from the Pueblo CO (KPUX) ORDA and clearly defines the areas of normal ground return as seen by this radar. The right hand image is the Base Reflectivity data from the .5° elevation slice from the KPUX radar under clear-air conditions. Compare the placement of the Bypass Map identified targets to the reflectivity image. Note the thin reflectivity lines that outline the downrange edges of the identified mountains. (This is easiest to see in the return just north of Raton and along the county line on the western side of the images.) These returns are due to the 1 km displacement of the identified ground return in the Bypass Map.

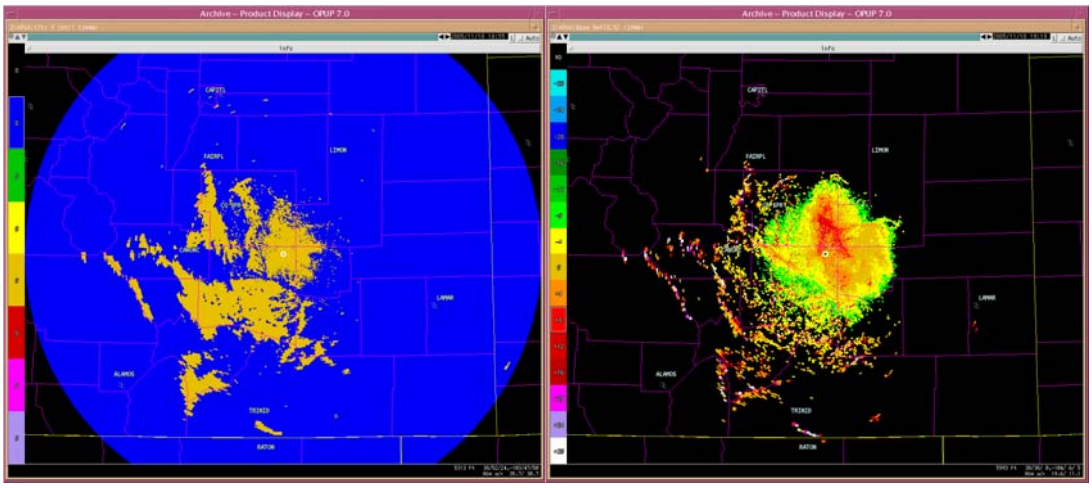

Figure 1: Bypass Map (Left) and Base Reflectivity (Right) Collected from the Pueblo CO (KPUX) ORDA

An example of the operational impact of this Bypass Map range placement error is provided in Figure 2. The reflectivity image on the left was collected with the Bypass Map in control. For comparison purposes, the reflectivity image on the right was collected with clutter suppression being applied to all bins. Comparing the two images,

notice the absence of the thin reflectivity lines that correspond to the downrange edges of the mountain targets in the right side image. (NOTE: Applying suppression using a Bypass Map generated with the correct adaptation data settings would result in the data collected via these two methods being nearly identical.)

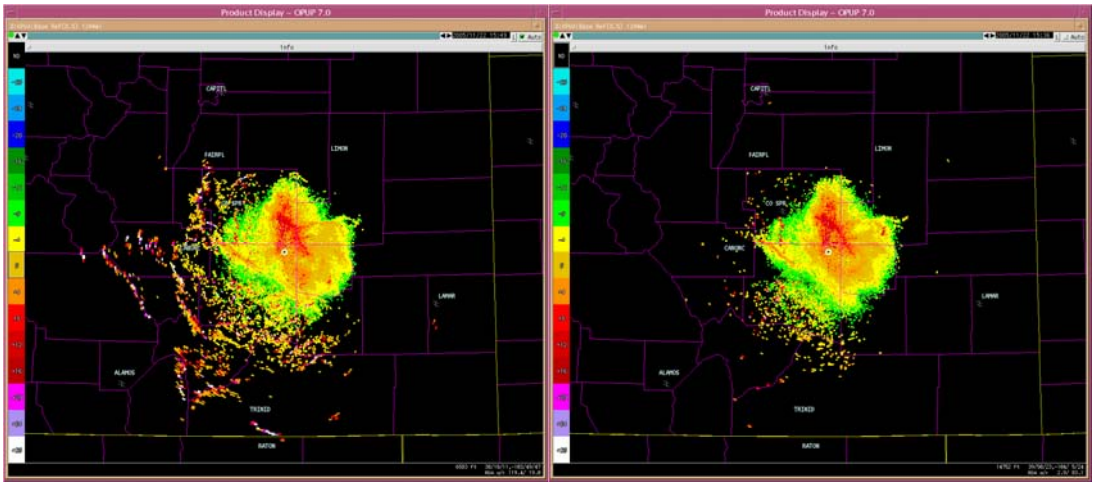

Figure 2: Base Reflectivity with Bypass Map Controlled Suppression (Left) and Base Reflectivity with All Bins Suppression (Right) Collected from the Pueblo CO (KPUX) ORDA

Work Around: The 1 km error in the Bypass Map is corrected in the Build 8 software release which is scheduled for deployment in late Spring, 2006. Until that time, affected sites have 2 options for addressing the clutter that falls on the downrange edge of identified clutter targets. Although two options are presented, Option 2 has less negative impact on the data and is therefore the option recommended by the ROC.

Option 1: For Elevation Segment 1, use All Bins suppression for the entire range data of the radar. This option is invoked by defining and downloading a clutter region for Elevation Segment 1 with "**All Bins**" as the (Operator) Select Code (See Figure 3).

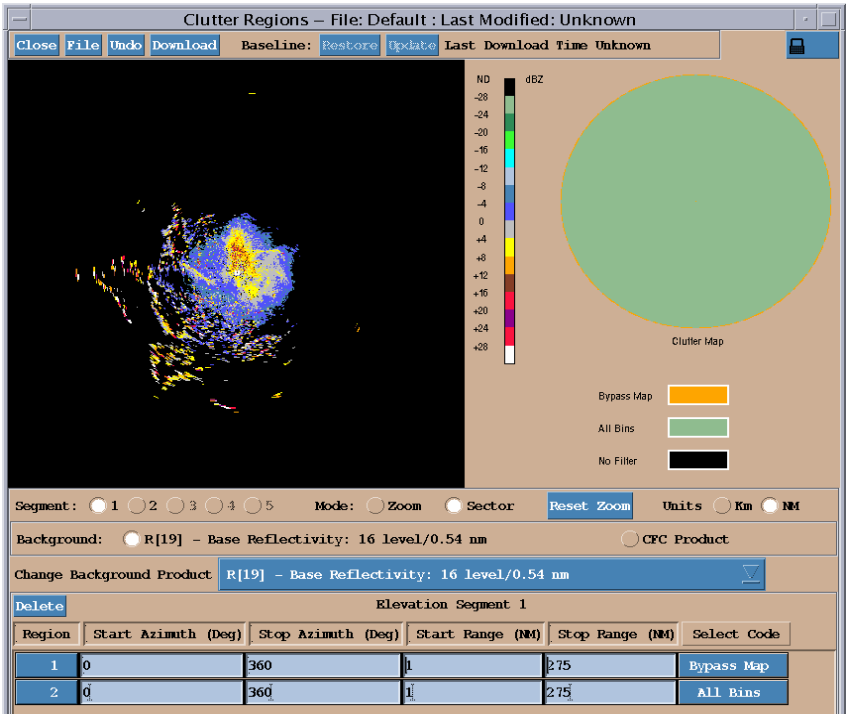

Figure 3: Clutter Regions Window Defining All Bins Suppression for Elevation Segment 1

WARNING:

While Option 1 is effective in suppressing the unwanted clutter not addressed by the Bypass Map, significant data bias (weakened/reduced reflectivity returns (Figure 4), velocity estimates biased away from zero, and broadening of the spectrum widths in weak velocity areas) will be apparent along the zero isodop in areas of laminar flow.

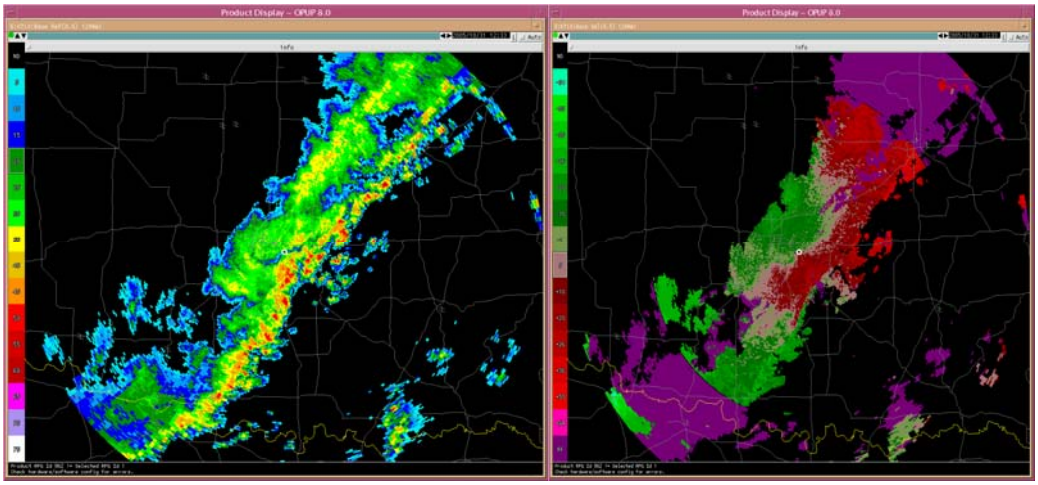

Figure 4: Base Reflectivity and Velocity with All Bins Suppression Collected from the Twin Lakes (Norman) OK (KTLX) ORDA

NOTE:

In Figure 4, notice the diminished reflectivity returns (coincident with the zero isodop) that run NE-SW through the RDA location.

If this placement error also impacts data for elevations angles above 1.5° (Elevation Segment 2), Option 1 workaround can also be applied. However, All Bins suppression ***should not*** be applied beyond 62nm for Elevation Segment 2.

Option 2: Apply operator-defined clutter regions that closely outline the unaddressed clutter. Figure 5 is an example Clutter Regions edit screen with regions defined for this purpose. This screen depicts the regions required to address the difficult clutter horizon present at Pueblo CO. This definition exercise took less than 5 minutes to complete and, once saved, may be invoked at any time within seconds.

Option 2 is recommended by the ROC.

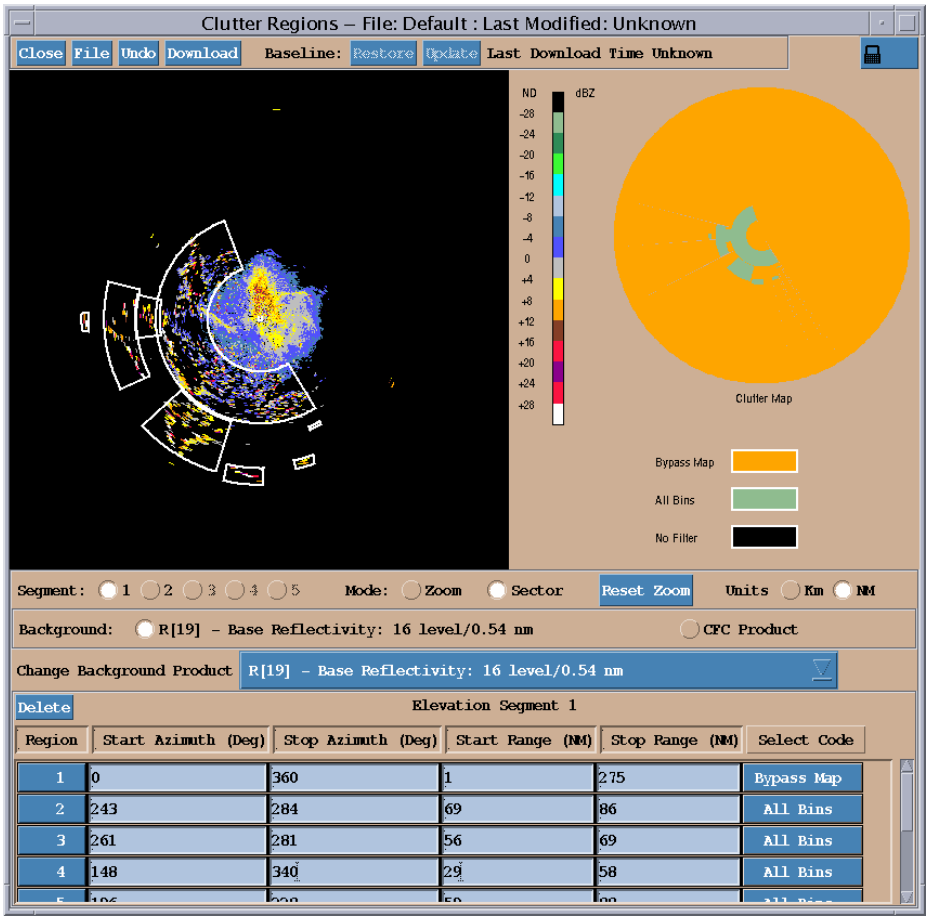

Figure 5: Clutter Regions Window Defining Customized Regions Outlining the Unaddressed Clutter Targets

After you are satisfied with the new clutter regions definitions, update your baseline adaptation data by selecting “Update” at the top of the Clutter Regions window. This will update the baseline adaptation file. Create a new Backup disk to facilitate recovery of these definitions should a future software reload be required.

Summary: The error in the Bypass Map starting range adaptation data setting will result in incomplete target identification for hard targets outside the local area of the RDA. Until the release of Build 8 additional clutter suppression application is required at these sites to adequately suppress these unaddressed hard target returns.

Recommendation: The ROC recommends **Option 2** as the best alternative. **Option 2** may take a few more minutes to setup, but is far more conservative and causes less clutter filter-induced bias on the base data.

If you have any questions or need assistance, contact the NEXRAD Hotline at 1-800-643-3363.